

POROUS MATERIALS



Ultra-lightweight porous metals, novel materials with tailorable properties, are under investigation at the Naval Research Laboratory (NRL) for a variety of applications. Both open-cell and closed-cell varieties are of interest, primarily for mechanical and thermal functions. Porosity values can vary from a few percent for closed-cell materials to over 98% for open-cell materials. NRL is currently involved in several projects. Current research topics include:

- Synthesis and processing (using a unique directional-solidification furnace based on the Ukrainian-developed GASAR process) of porous aluminum, magnesium and copper materials;
- Three-dimensional pore imaging and microstructural characterization by x-ray computed microtomography [see Figure];
- Quantitative image analysis for microstructural characterization via Dirichlet tessellation techniques;
- Materials testing and property characterization and property correlation with pore parameters such as size, spacing, aspect ratio and offset;
- Three-dimensional finite element modeling using tomographic or statistically-derived synthetic microstructures;
- Image-based finite element mesoscale modeling to capture realistic system-level response

Point of Contact

Naval Research Laboratory
4555 Overlook Ave., SW • Washington, D.C. 20375-5320

Richard K. Everett • Materials Science and Technology Division
(202) 767-3316
everett@anvil.nrl.navy.mil